

IN THE CLAIMS

The following listing of claims replaces all previous versions and listings of claims in the application:

Claim 1. (Currently Amended) A method of horizontally structured CAD/CAM manufacturing modeling for concurrent product and process design, comprising:

identifying a real-world blank for machining;

generating a virtual blank from a referenced set of geometries, the virtual blank corresponding to the real-world blank and lacking an associative relationship with a coordinate system;

creating a master product and process concurrent model having both process model and a product model characteristics, said master product and process concurrent model including ~~the~~ virtual blank, said master product and process concurrent model lacking an associative relationship with ~~the~~ coordinate system, ~~said virtual blank corresponding to said real-world blank;~~

virtual machining at least one manufacturing feature into said virtual blank, each of said at least one manufacturing feature exhibiting an associative relationship with said coordinate system;

generating a product drawing of a real-world component from said master product and process concurrent model; and

deriving manufacturing instructions from said master product and process concurrent model to create said real-world component by machining said at least one manufacturing feature into the real-world blank.

Claim 2. (Currently Amended) The method of Claim 1 wherein said associative relationship exhibited between said at least one manufacturing feature and said coordinate system is a parent/child relationship.

Claims 3 - 8. (Cancelled)

Claim 9. (Previously presented) The method of Claim 1 further comprising creating extracts from said master product and process concurrent model.

Claim 10. (Previously presented) The method of Claim 9 wherein said extracts comprise replicated models of said master product and process concurrent model at various operations of said manufacturing instructions.

Claim 11. (Original) The method of Claim 9 wherein said extracts are used to generate manufacturing process sheets.

Claim 12. (Canceled)

Claim 13. (Previously presented) The method of Claim 1 wherein said virtual blank is generated as a three dimensional parametric solid model from a reference set geometry.

Claim 14. (Original) The method of Claim 13 wherein said reference set geometry is defined by dimensional characteristics of a modeled part.

Claim 15. (Previously presented) The method of Claim 1 wherein said coordinate system comprises one or more datum planes.

Claim 16. (Currently Amended) The method of Claim 15 wherein said one or more datum planes comprises:

a first datum plane positioned and oriented relative to a reference;
a second datum plane positioned and oriented relative to said reference; and
a third datum plane positioned and oriented relative to said reference.

Claim 17. (Original) The method of Claim 16 wherein said first datum plane, said second datum plane, and said third datum plane are orthogonal.

Claim 18. (Original) The method of Claim 1 wherein said manufacturing instructions comprise process sheets.

Claims 19 and 20. (Cancelled)

Claim 21. (Original) The method of Claim 1 further comprising said master product and process concurrent model links to a process planning system.

Claim 22. (Original) The method of Claim 21 wherein said process planning system comprises automated creation of a manufacturing process plan.

Claim 23. (Currently Amended) A real-world component created utilizing a method of horizontally structured CAD/CAM manufacturing modeling for concurrent product and process design, the method comprising:

identifying a real-world blank for machining;
generating a virtual blank from a referenced set of geometries, the virtual blank corresponding to the real-world blank and lacking an associative relationship with a coordinate system;

creating a master product and process concurrent model having both process model and a product model characteristics, said master product and process concurrent model including the virtual blank, said master product and process concurrent model lacking an associative relationship with the coordinate system, said virtual blank corresponding to a said real-world blank;

virtual machining at least one manufacturing feature into said virtual blank, each of said at least one manufacturing feature exhibiting an associative relationship with said coordinate system;

generating a product drawing of a real-world component from said master product and process concurrent model; and

deriving manufacturing instructions from said master product and process concurrent model to create said real-world component by machining said at least one manufacturing feature into the real-world blank.

Claim 24. (Currently Amended) The manufactured part of Claim 23 wherein said associative relationship exhibited between said at least one manufacturing feature and said coordinate system is a parent/child relationship.

Claims 25 - 30. (Cancelled)

Claim 31. (Original) The manufactured part of Claim 23 further comprising extracts created from said master product and process concurrent model.

Claim 32. (Previously presented) The manufactured part of Claim 31 wherein said extracts comprise replicated models of said master product and process concurrent model at various operations of said manufacturing instructions.

Claim 33. (Original) The manufactured part of Claim 32 wherein said extracts are used to generate manufacturing process sheets.

Claim 34. (Cancelled)

Claim 35. (Previously presented) The manufactured part of Claim 23 wherein said virtual blank is generated as a three dimensional parametric solid model from a reference set geometry.

Claim 36. (Original) The manufactured part of Claim 35 wherein said reference set geometry is defined by dimensional characteristics of a modeled part.

Claim 37. (Original) The manufactured part of Claim 23 wherein said coordinate system comprises one or more datum planes.

Claim 38. (Currently Amended) The manufactured part of Claim 37 wherein said one or more datum planes comprises:

a first datum plane positioned and oriented relative to a reference;
a second datum plane positioned and oriented relative to said reference; and
a third datum plane positioned and oriented relative to said reference.

Claim 39. (Original) The manufactured part of Claim 38 wherein said first datum plane, said second datum plane, and said third datum plane are orthogonal.

Claim 40. (Original) The manufactured part of Claim 23 wherein said manufacturing instructions comprise process sheets.

Claims 41 and 42. (Cancelled)

Claim 43. (Original) The manufactured part of Claim 23 further comprising said master product and process concurrent model links to a process planning system.

Claim 44. (Original) The manufactured part of Claim 43 wherein said process planning system comprises automated creation of a manufacturing process plan.

Claim 45. (Currently Amended) A storage medium encoded with a machine-readable computer program code for horizontally structured CAD/CAM manufacturing modeling for concurrent product and process design, said storage medium including instructions for causing a computer to implement a method comprising:

identifying a real-world blank for machining;

generating a virtual blank from a referenced set of geometries, the virtual blank corresponding to the real-world blank and lacking an associative relationship with a coordinate system;

creating a master product and process concurrent model having both process model and a product model characteristics, said master product and process concurrent model including the virtual blank, said master product and process concurrent model lacking an associative relationship with the coordinate system, said virtual blank corresponding to said real-world blank;

virtual machining at least one manufacturing feature into said virtual blank, each of said at least one manufacturing feature exhibiting an associative relationship with said coordinate system;

generating a product drawing of a real-world component from said master product and process concurrent model; and

deriving manufacturing instructions from said master product and process concurrent model to create said real-world component by machining said at least one manufacturing feature into the real-world blank.

Claim 46. (Currently Amended) The storage medium of Claim 45 wherein said associative relationship exhibited between said at least one manufacturing feature and said coordinate system is a parent/child relationship.

Claims 47 - 52. (Cancelled)

Claim 53. (Original) The storage medium of Claim 45 further comprising creating extracts from said master product and process concurrent model.

Claim 54. (Previously presented) The storage medium of Claim 53 wherein said extracts comprise replicated models of said master product and process concurrent model at various operations of said manufacturing instructions.

Claim 55. (Original) The storage medium of Claim 53 wherein said extracts are used to generate manufacturing process sheets.

Claim 56. (Cancelled)

Claim 57. (Previously presented) The storage medium of Claim 45 wherein said virtual blank is generated as a three dimensional parametric solid model from a reference set geometry.

Claim 58. (Original) The storage medium of Claim 57 wherein said reference set geometry is defined by dimensional characteristics of a modeled part.

Claim 59. (Original) The storage medium of Claim 45 wherein establishing said coordinate system comprises one or more datum planes.

Claim 60. (Currently Amended) The storage medium of Claim 59 wherein said one or more datum planes comprises:

a first datum plane positioned and oriented relative to a reference;
a second datum plane positioned and oriented relative to said reference; and
a third datum plane positioned and oriented relative to said reference.

Claim 61. (Original) The storage medium of Claim 60 wherein said first datum plane, said second datum plane, and said third datum plane are orthogonal.

Claim 62. (Original) The storage medium of Claim 45 wherein said manufacturing instructions comprise process sheets.

Claims 63 and 64. (Cancelled)

Claim 65. (Original) The storage medium of Claim 45 further comprising said master product and process model links to a process planning system.

Claim 66. (Original) The storage medium of Claim 65 wherein said process planning system comprises automated creation of a manufacturing process plan.

Claim 67. (Currently Amended) A computer data signal tangibly embodied in a computer-readable medium and propagated over a transmission medium for communicating with a computer, said signal including code configured to cause a computer to implement a method for horizontally structured CAD/CAM manufacturing modeling for concurrent product and process design, the method comprising:

identifying a real-world blank for machining;
generating a virtual blank from a referenced set of geometries, the virtual blank corresponding to the real-world blank and lacking an associative relationship with a coordinate system;

creating a master product and process concurrent model having both process model and a product model characteristics, said master product and process concurrent model including the virtual blank, said master product and process concurrent model lacking an associative relationship with the coordinate system, said virtual blank corresponding to said real-world blank;

virtual machining at least one manufacturing feature into said virtual blank, each of said at least one manufacturing feature exhibiting an associative relationship with said coordinate system;

generating a product drawing of a real-world component from said master product and process concurrent model; and

deriving manufacturing instructions from said master product and process concurrent model to create said real-world component by machining said at least one manufacturing feature into the real-world blank.

Claim 68. (Currently Amended) The computer data signal of Claim 67 wherein said associative relationship exhibited between said at least one manufacturing feature and said coordinate system is a parent/child relationship.

Claims 69 - 74. (Cancelled)

Claim 75. (Original) The computer data signal of Claim 67 further comprising creating extracts from said master product and process concurrent model.

Claim 76. (Original) The computer data signal of Claim 75 wherein said extracts comprise replicated models of said master product and process concurrent model at various operations of said manufacturing.

Claim 77. (Original) The computer data signal of Claim 75 wherein said extracts are used to generate manufacturing process sheets.

Claim 78. (Cancelled)

Claim 79. (Previously presented) The computer data signal of Claim 67 wherein said virtual blank is generated as a three dimensional parametric solid model from a reference set geometry.

Claim 80. (Original) The computer data signal of Claim 79 wherein said reference set geometry is defined by dimensional characteristics of a modeled part.

Claim 81. (Previously presented) The computer data signal of Claim 67 wherein said coordinate system comprises one or more datum planes.

Claim 82. (Currently Amended) The computer data signal of Claim 81 wherein said one or more datum planes comprises:

a first datum plane positioned and oriented relative to a reference;
a second datum plane positioned and oriented relative to said reference; and
a third datum plane positioned and oriented relative to said reference.

Claim 83. (Original) The computer data signal of Claim 82 wherein said first datum plane, said second datum plane, and said third datum plane are orthogonal.

Claim 84. (Original) The computer data signal of Claim 67 wherein said manufacturing instructions comprise process sheets.

Claims 85 and 86. (Cancelled)

Claim 87. (Original) The computer data signal of Claim 67 further comprising said master product and process concurrent model links to a process planning system.

Claim 88. (Original) The computer data signal of Claim 87 wherein said process planning system comprises automated creation of a manufacturing process plan.

89. (New) The method of Claim 14 wherein said modeled part is based on a base feature and a form feature.

90. (New) The manufactured part of Claim 36 wherein said modeled part is based on a base feature and a form feature.

91. (New) The storage medium of Claim 58 wherein said modeled part is based on a base feature and a form feature.

92. (New) The computer data signal of Claim 80 wherein said modeled part is based on a base feature and a form feature.

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